Background
Healthcare associated infection (HCAI) is a patient safety issue. Compliance with hand hygiene guidelines has been demonstrated to be an effective method of reducing HCAI, however it remains suboptimal and poorer amongst physicians compared to other healthcare workers.

Study Aim
The aim of this study was to determine the relationship between a multimodal quality improvement intervention, incorporating observational hand hygiene auditing with individualised feedback to physicians, and the incidence of surgical site infection (SSI). We aimed to test the hypothesis that a multimodal hand hygiene intervention would lead to at least a 1% drop (to 0.44%) in orthopaedic surgical site infection (SSI).

Methodology
The research design is a quasi-experimental retrospective before and after study design.

Population:
All patients who were underwent total knee or total hip replacement surgery during the study period (Figure 1) in a 345 bedded acute private hospital in Ireland.

Intervention:
The multimodal intervention was implemented from Q4 2011 to Q3 2012 and included elements as depicted in Figure 1.

Control:
Pre-intervention data (February 2009 - September 2011) provided a control for analysis against the post-intervention data (October 2012 - December 2015).

Outcome:
1. Rate of surgical site infection in patients who received a knee or hip replacement during the study periods.
2. The proportion of observed hand-hygiene compliance with hand hygiene guidelines (WHO 2009), for hospital staff, consultant physician staff and orthopaedic surgeon staff

Analysis
Before and after intervention proportions were compared using chi-square test (Shardell et al 2007).

Results
No significant differences in patient gender or American Society of Anaesthesiologists (ASA) score were identified between patients pre 2009 – 2011 (n=1,936) and post intervention, 2013 – 2015 (n = 1,743), Table 1. Exact demographics excluding the intervention period were not possible due to the nature of data collected.

Table 1. Patient Demographics

<table>
<thead>
<tr>
<th>Sample Size</th>
<th>Pre intervention</th>
<th>Post Intervention</th>
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<tbody>
<tr>
<td>Period Specified</td>
<td>n= 1,963</td>
<td>n= 1,743</td>
</tr>
<tr>
<td>Gender (Male)</td>
<td>917 (47%)</td>
<td>787 (45%)</td>
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<tr>
<td>ASA Score ≥ 3</td>
<td>95% CI (0.44 - 0.49)</td>
<td>95% CI (0.43 - 0.47)</td>
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The risk of a patient developing an orthopaedic SSI decreased from 1.44%, (n=26), in the pre-intervention phase to 0.74% (n=14) in the post intervention phase,  0.04. The risk difference pre and post intervention is 0.7%. (95%CI 0.69 – 0.71), Figure 1. There was a statistically significant increase in observed hand hygiene compliance in all healthcare workers to 91%, (95%CI 0.90 – 0.91) p < 0.01, an 18% increase in compliance amongst consultant physician staff, p < 0.01, Figure 2. A significant increase in compliance in consultant orthopaedic surgeon staff at 98% (95%CI 0.97 – 0.98) compared to consultant physician staff was demonstrated, p < 0.01.

Discussion
While we did not reach the hypothesised reduction in SSI of 1%, there is a statistically significant reduction in SSI. There is also a statistically significant increase in observed hand hygiene compliance. Providing targeted individualised audit feedback significantly improves compliance with hand hygiene guidelines and reduces the incidence of surgical site infection.

Reference


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